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Drewett

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(54) **ROTATABLE SPRAY GUN LIGHT**

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(22) Filed: **Jun. 29, 2021**

(51) **Int. Cl.**

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B05B 9/01	(2006.01)
F21S 9/02	(2006.01)
F21V 23/00	(2015.01)
F21Y 115/10	(2016.01)

(52) **U.S. Cl.**
CPC ***B05B 15/00*** (2013.01); ***B05B 9/01*** (2013.01); ***F21S 9/02*** (2013.01); ***F21V 23/001*** (2013.01); *F21Y 2115/10* (2016.08)

(58) **Field of Classification Search**
CPC B05B 15/00; B05B 9/01; F21S 9/02; F21V 23/001; F21Y 215/10
See application file for complete search history.

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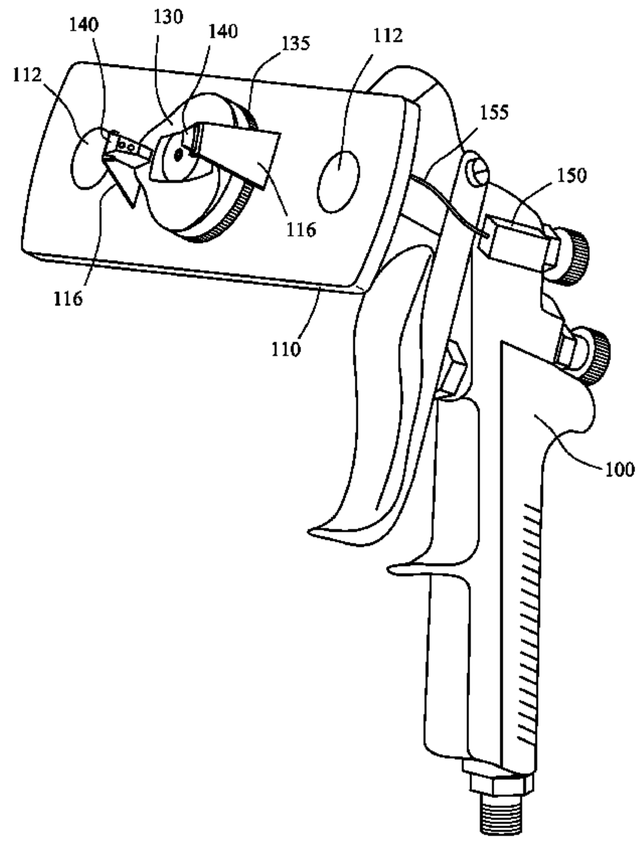
(57) **ABSTRACT**

In one embodiment, a spray gun light includes an aperture configured to allow the spray gun light to attach over an air cap of a spray gun. The spray gun light also includes multiple horn clips. Each horn clip is configured to couple to a respective horn of a plurality of horns of the air cap of the spray gun. The spray gun light also includes a plurality of lights that include a first light configured to shine light along a first side of a spray plume generated by the air cap, and a second light configured to shine light on along a second side of the spray plume that is opposite the first side. The spray gun light is configured to rotate along with the air cap as the air cap is rotated, thereby preventing light from the plurality of lights from being blocked by the spray plume.

19 Claims, 7 Drawing Sheets



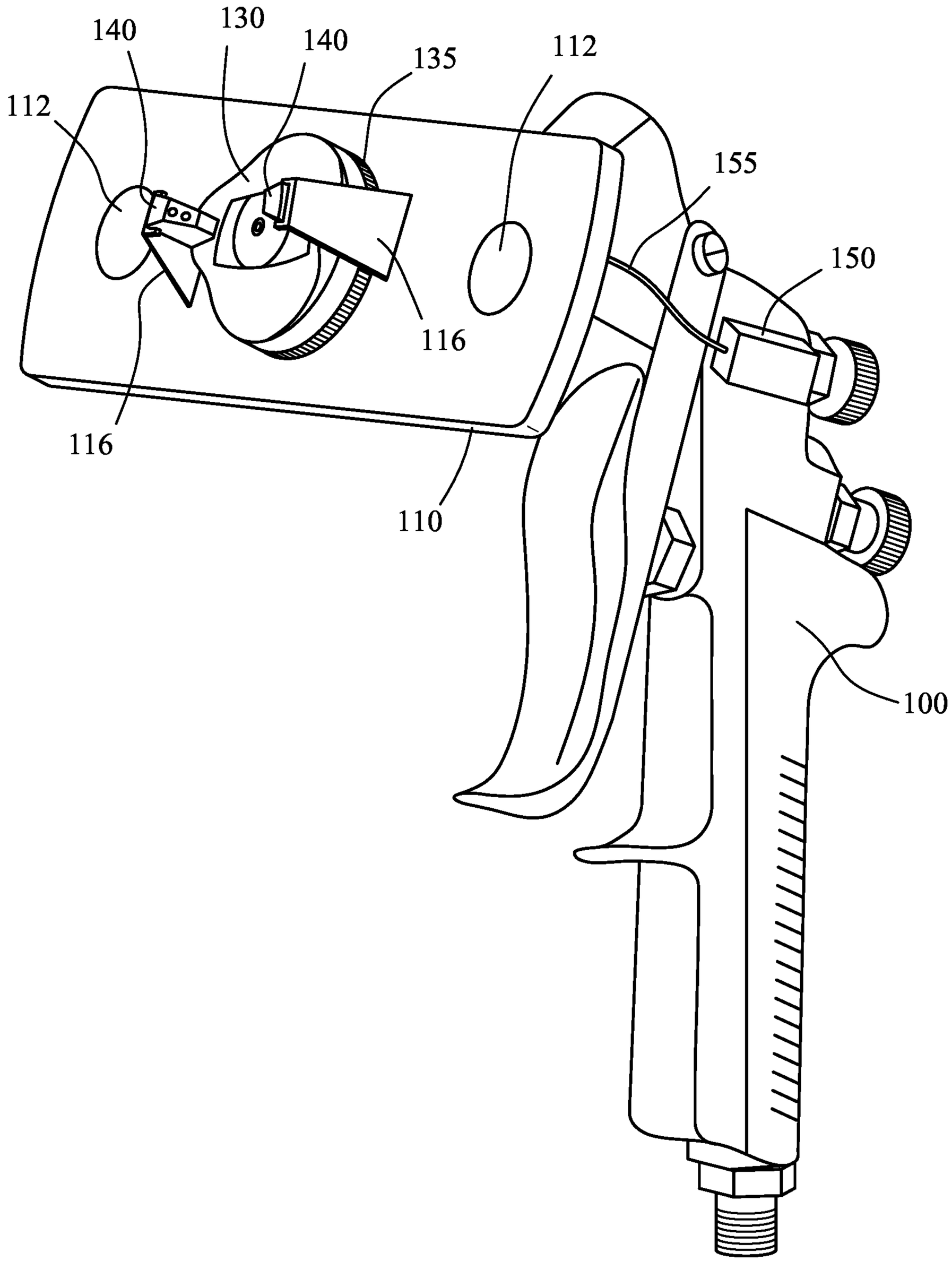


FIG.1A

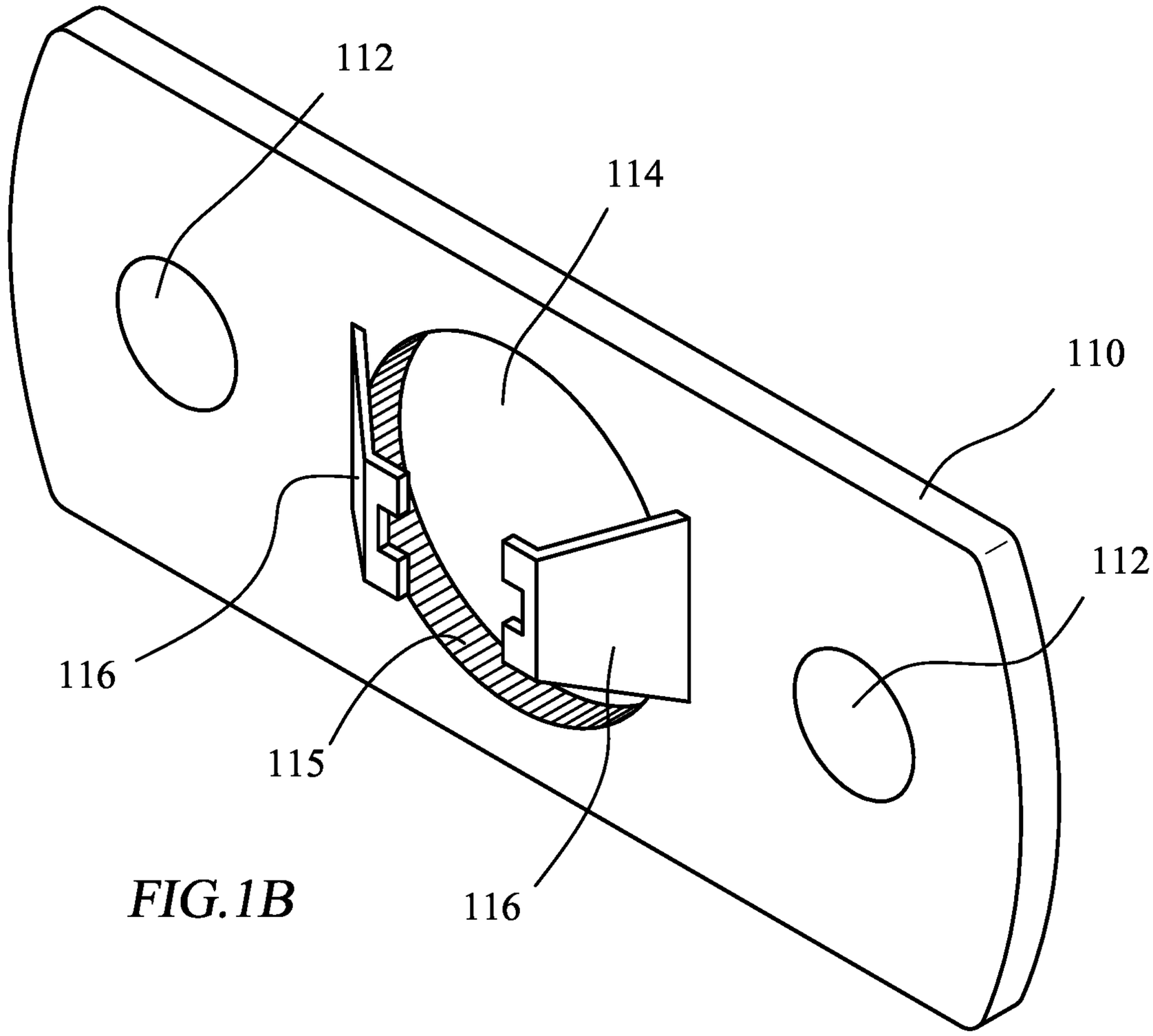


FIG.1B

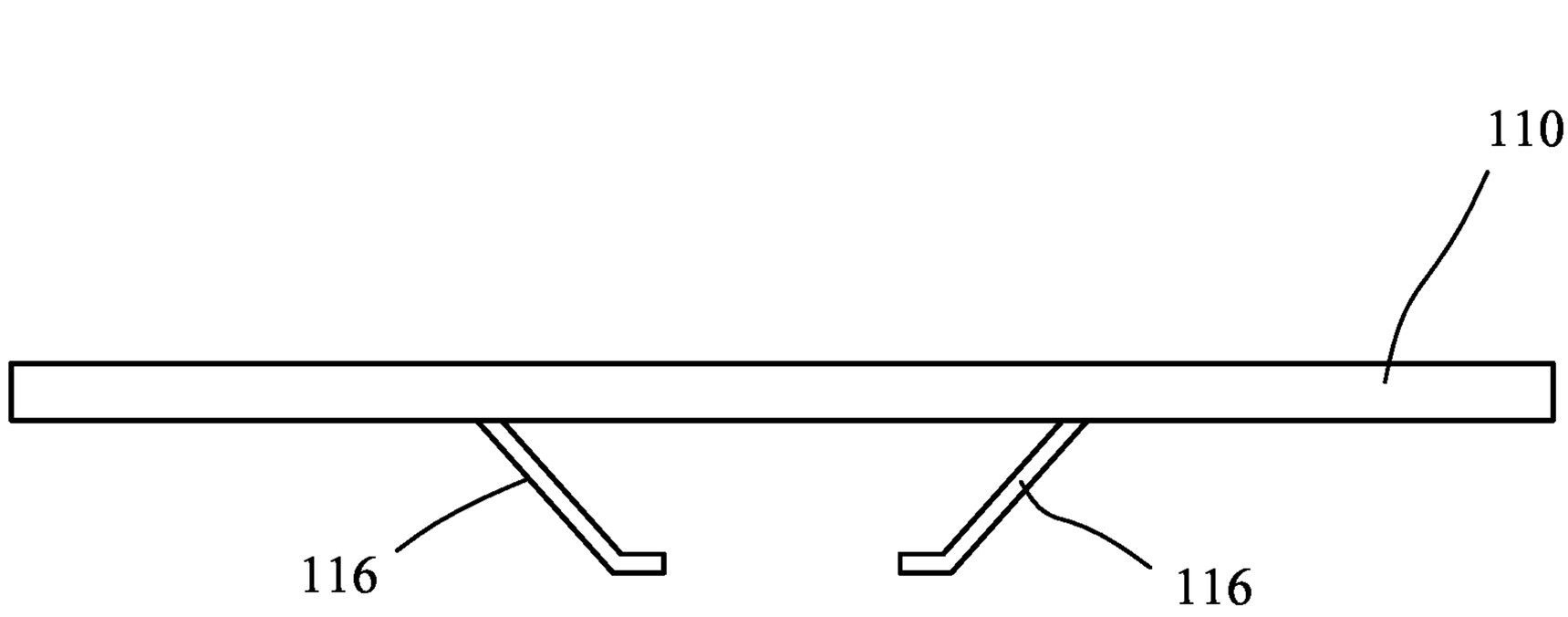


FIG.1C

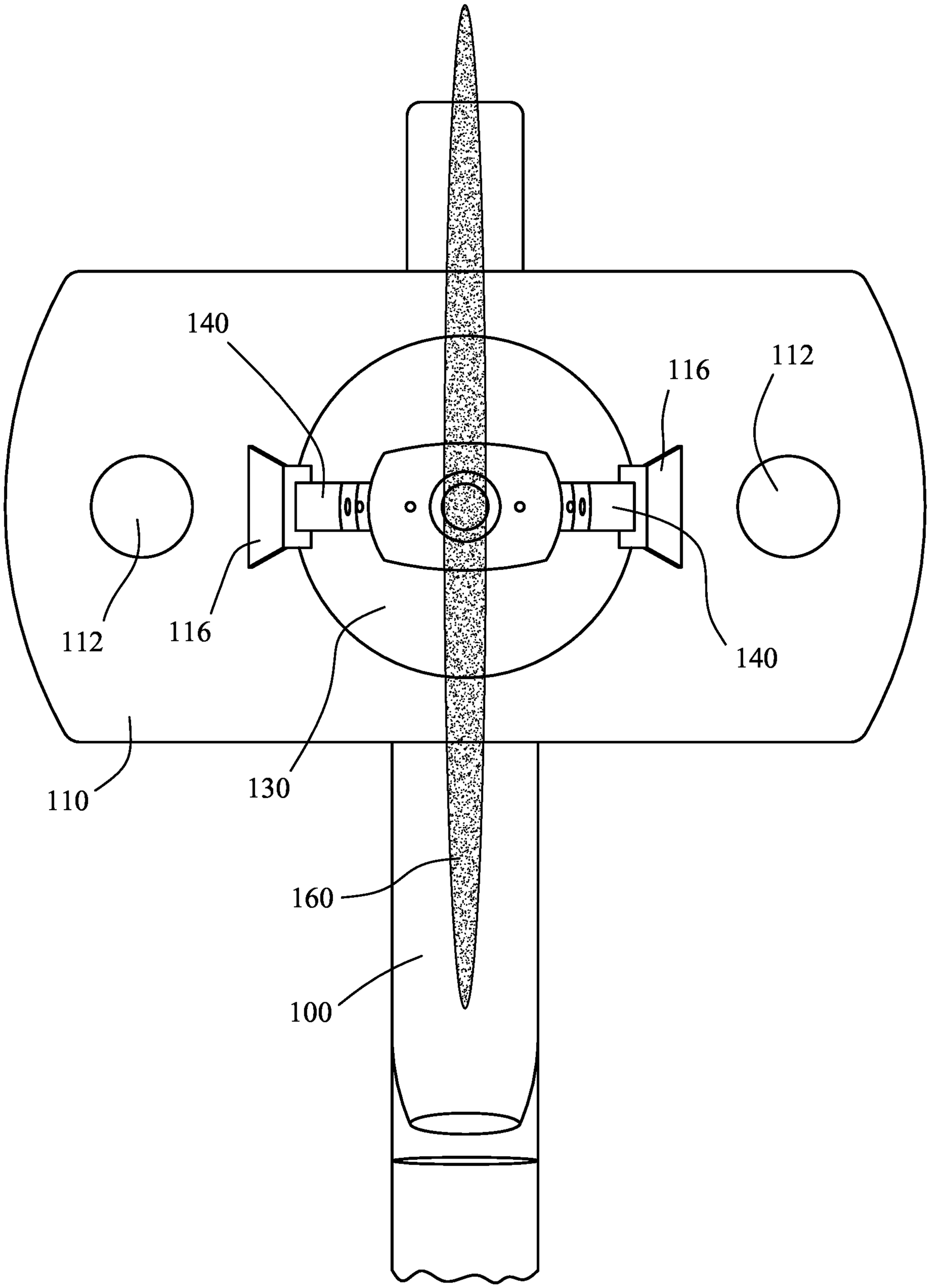


FIG.2A

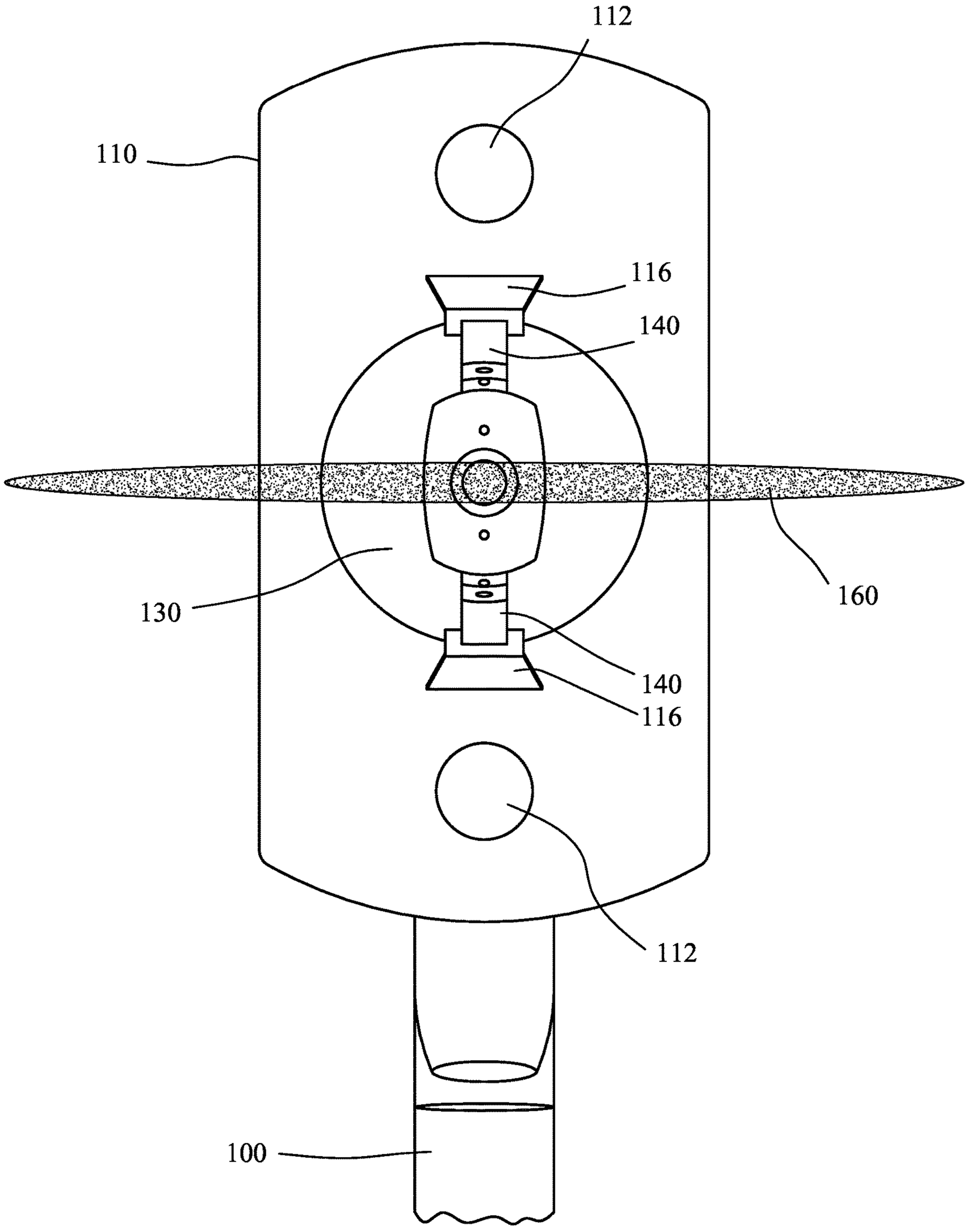


FIG.2B

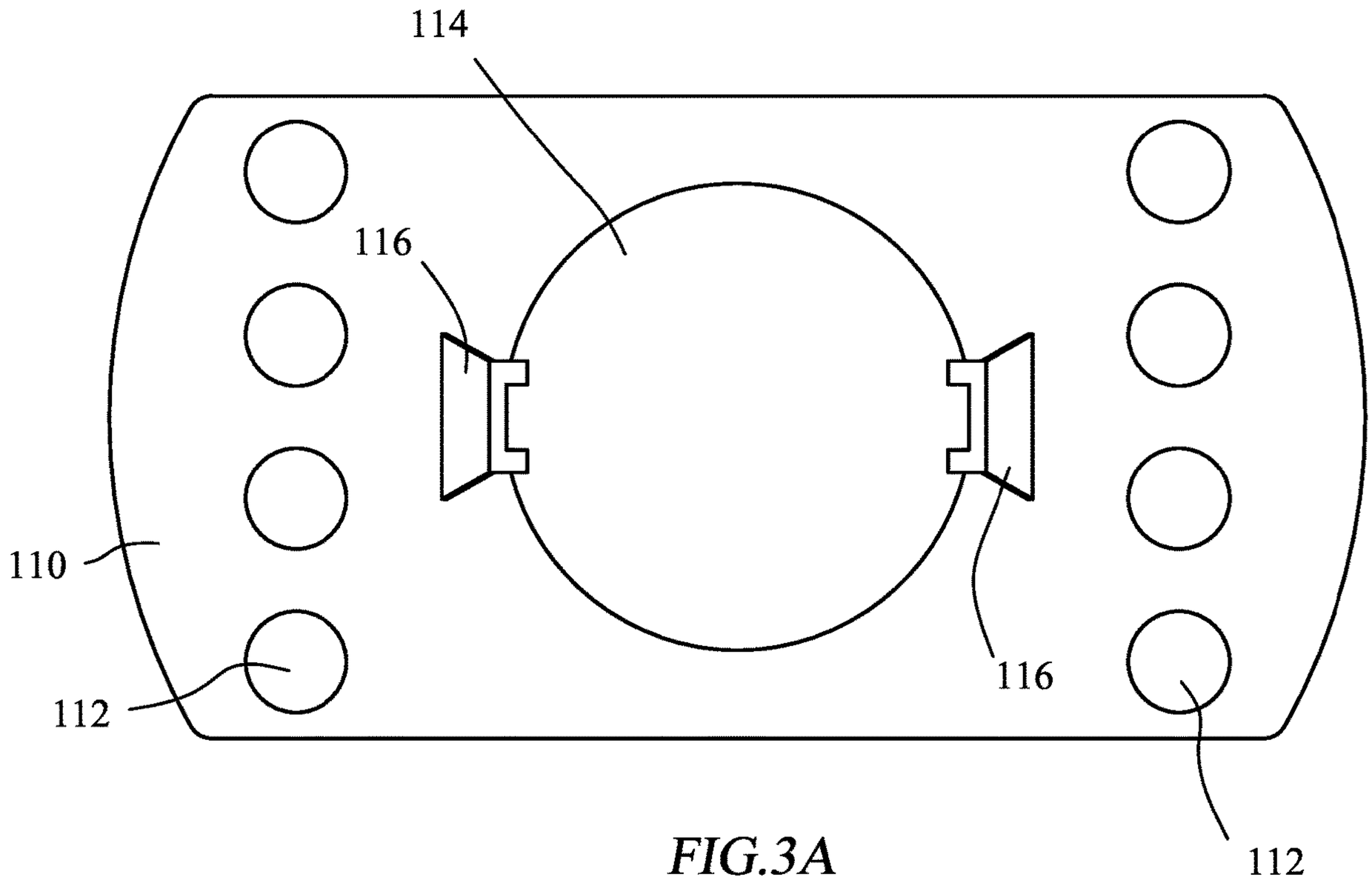


FIG.3A

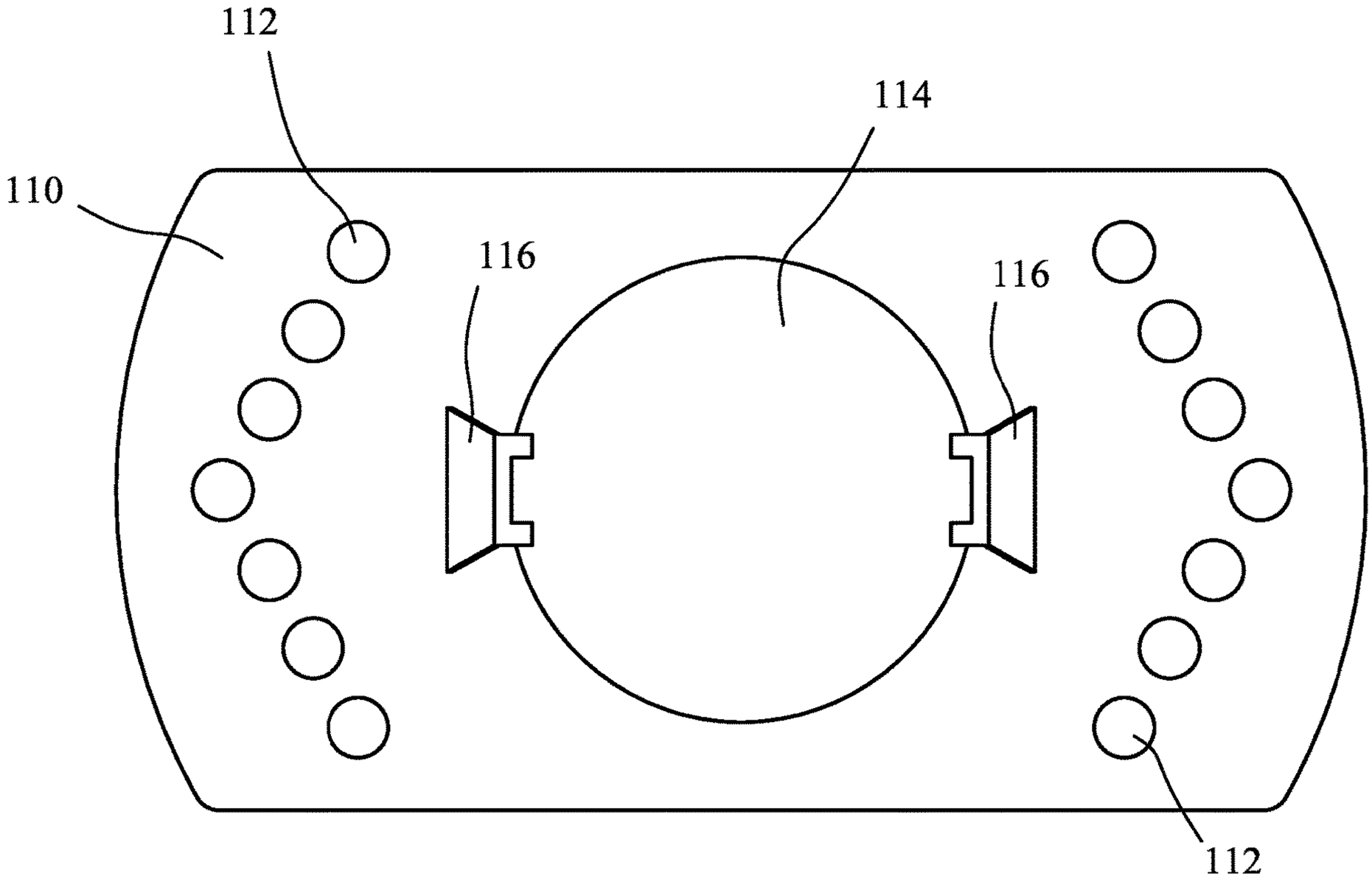


FIG.3B

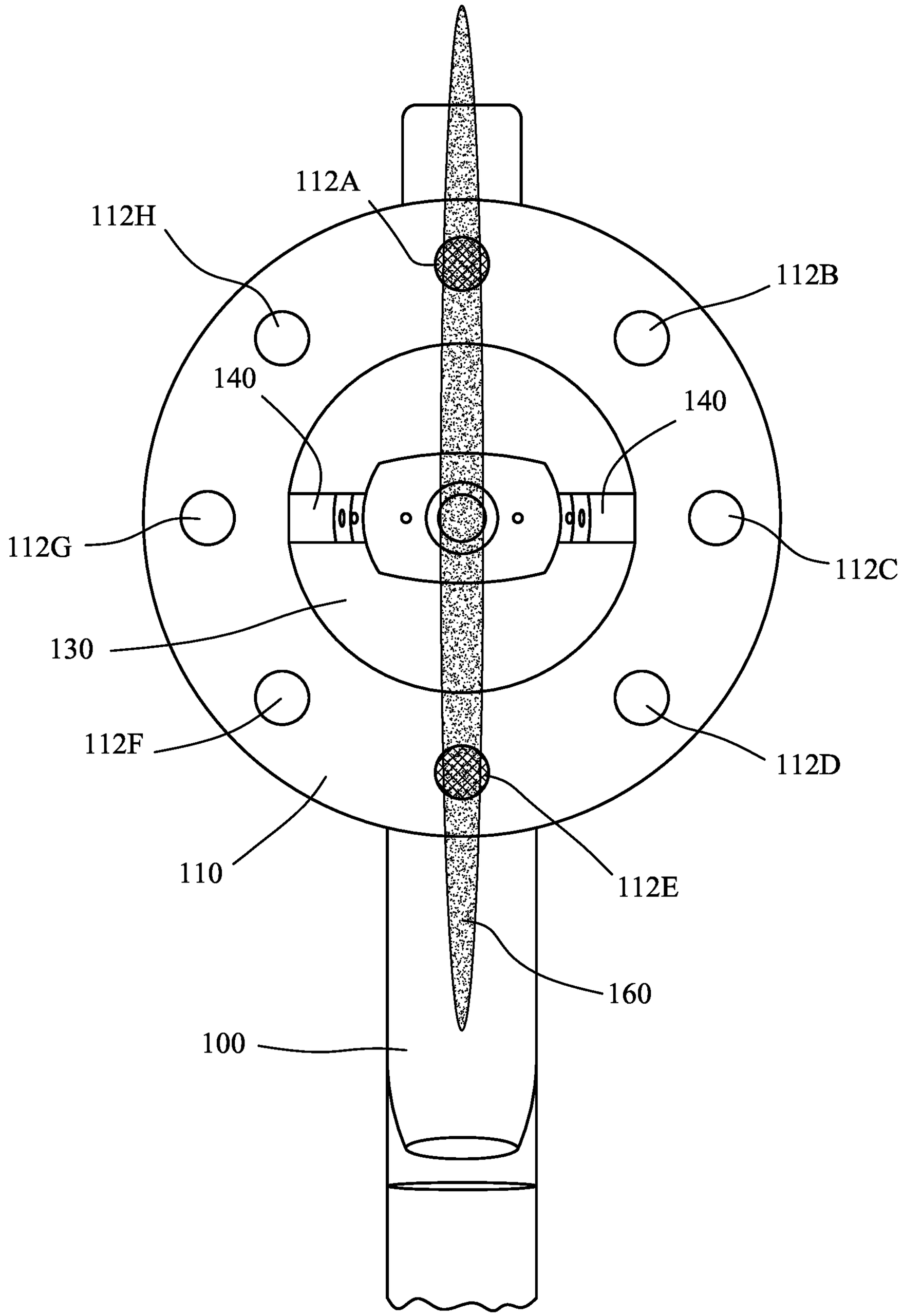

112A
112H
112B
140
140
112G
112C
130
112F
112D
110
112E
160
100

FIG.4A

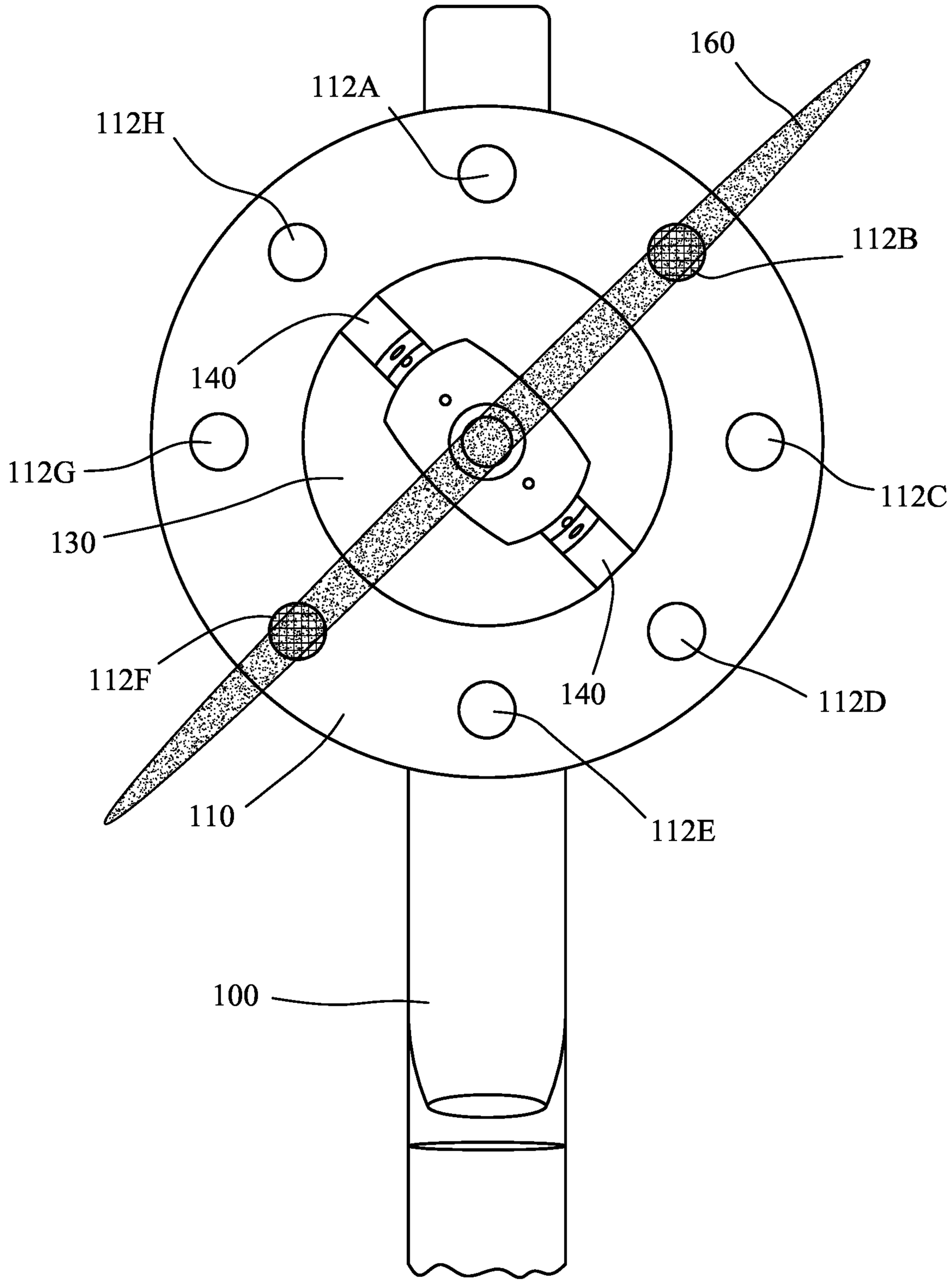

160
112A
112H
112B
140
112G
112C
130
112F
140
112D
110
112E
100

FIG.4B

ROTATABLE SPRAY GUN LIGHT

TECHNICAL FIELD

This disclosure generally relates to spray guns and more specifically to a rotatable spray gun light.

BACKGROUND

Spray guns are used for many different applications in many different industries. As one example, automobile repair facilities utilize spray guns to apply paint to automobile body parts. As another example, aircraft manufacturers use spray guns to apply coatings such as paint to various components of aircraft. The spray plumes of spray guns sometimes make it difficult for operators to see the area they are spraying.

SUMMARY OF PARTICULAR EMBODIMENTS

In one embodiment, a spray gun light includes an aperture configured to allow the spray gun light to attach over an air cap of a spray gun. The spray gun light also includes a plurality of horn clips. Each horn clip is configured to couple to a respective horn of a plurality of horns of the air cap of the spray gun. The spray gun light also includes a plurality of lights that include a first light configured to shine light along a first side of a spray plume generated by the air cap, and a second light configured to shine light on along a second side of the spray plume that is opposite the first side. The spray gun light is configured to rotate along with the air cap as the air cap is rotated, thereby preventing light from the plurality of lights from being blocked by the spray plume.

In another embodiment, a system includes a battery pack and a spray gun light electrically coupled to the battery back. The spray gun light includes an aperture configured to allow the spray gun light to attach over an air cap of a spray gun. The spray gun light also includes a plurality of horn clips. Each horn clip is configured to couple to a respective horn of a plurality of horns of the air cap of the spray gun. The spray gun light also includes a plurality of lights that include a first light configured to shine light along a first side of a spray plume generated by the air cap, and a second light configured to shine light on along a second side of the spray plume that is opposite the first side. The spray gun light is configured to rotate along with the air cap as the air cap is rotated, thereby preventing light from the plurality of lights from being blocked by the spray plume.

In another embodiment, a spray gun light includes a first plurality of lights and a second plurality of lights. The first plurality of lights are configured to shine light along a first side of a spray plume generated by an air cap of a spray gun. The second plurality of lights are configured to shine light along a second side of the spray plume that is opposite the first side. The spray gun light is configured to rotate along with the air cap as the air cap is rotated, thereby preventing light from the first and second plurality of lights from being blocked by the spray plume.

The present disclosure provides numerous technical advantages over existing spray gun lighting. As one example, the disclosed rotatable spray gun lights are configured to attach to an air cap of a spray gun and are configured to rotate along with the air cap as the air cap is rotated by the operator. The rotatable spray gun lights include multiple lights that are each configured to shine light along the opposite sides of a spray plume generated by the air cap. Because the rotatable spray gun light rotates along with the air cap as the air cap is rotated, the spray plume never blocks the lights of the rotatable spray gun light. This increases the efficiency of the spray gun and decreases operation time.

Other technical advantages will be readily apparent to one skilled in the art from the following figures, descriptions, and claims. Moreover, while specific advantages have been enumerated herein, various embodiments may include all, some, or none of the enumerated advantages.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1**A illustrates a rotatable spray gun light installed on a spray gun, according to certain embodiments.

FIG. **1**B illustrates a perspective view of the rotatable spray gun light of FIG. **1**A, according to certain embodiments.

FIG. **1**C illustrates a top-down view of the rotatable spray gun light of FIG. **1**A, according to certain embodiments.

FIG. **2**A illustrates a front view of the rotatable spray gun light of FIG. **1**A, according to certain embodiments.

FIG. **2**B illustrates another front view of the rotatable spray gun light of FIG. **1**A, according to certain embodiments.

FIGS. **3**A and **3**B illustrate alternate configurations of the rotatable spray gun light of FIG. **1**A, according to certain embodiments.

FIG. **4**A illustrates a front view of another embodiment of a rotatable spray gun light installed on a spray gun, according to certain embodiments.

FIG. **4**B illustrates another front view of the rotatable spray gun light of FIG. **4**A, according to certain embodiments.

DESCRIPTION OF EXAMPLE EMBODIMENTS

Spray guns are used for many different applications in many different industries. As one example, automobile repair facilities utilize spray guns to apply paint to automobile body parts. As another example, aircraft manufacturers use spray guns to apply coatings such as paint to various components of aircraft. The spray plumes of spray guns sometimes make it difficult for operators to see the area they are spraying. For example, when an operator rotates an air cap of the spray gun in order to rotate the spray plume generated by the air gun, the spray plume may block any existing lights from the air gun. This may reduce visibility and reduce efficiency of the air gun.

To address these and other problems with typical spray guns, the disclosed embodiments provide rotatable spray gun lights that are configured to attach to an air cap of a spray gun and are configured to rotate along with the air cap as the air cap is rotated by the operator. The rotatable spray gun light includes multiple lights that are each configured to shine light along the opposite sides of a spray plume generated by the air cap. Because the rotatable spray gun light rotates along with the air cap as the air cap is rotated, the spray plume never blocks or interferes with the lights of the rotatable spray gun light (i.e., the lights of the rotatable spray gun light never shine through the spray plume). This increases the efficiency of the spray gun and decreases operation time.

To facilitate a better understanding of the present disclosure, the following examples of certain embodiments are given. In no way should the following examples be read to limit or define the scope of the disclosure. Embodiments of

the present disclosure and its advantages may be best understood by referring to the included FIGURES, where like numbers are used to indicate like and corresponding parts.

Certain embodiments of a rotatable spray gun light **110** will now be described in reference to FIGS. **1**A-**2**B. FIG. **1**A illustrates a rotatable spray gun light **110** installed on a spray gun **100**; FIG. **1**B illustrates a perspective view of the rotatable spray gun light **110** of FIG. **1**A; FIG. **1**C illustrates a top-down view of the rotatable spray gun light **110** of FIG. **1**A; and FIGS. **2**A-**2**B illustrate front views of the rotatable spray gun light **110** of FIG. **1**A, according to certain embodiments. As illustrated in these figures, rotatable spray gun light **110** includes multiple lights **112**, an air cap aperture **114**, and horn clips **116**. Rotatable spray gun light **110** is coupled to a battery pack **150** via a battery cable **155**. Battery pack **150** supplies the electrical power needed to power lights **112**. In general, rotatable spray gun light **110** illuminates a work area for spray gun **100** (e.g., an object being sprayed by spray gun **100**). Lights **112** are located on sides of a spray plume **160** generated by spray gun **100**. Since rotatable spray gun light **110** rotates along with air cap **130**, spray plume **160** is prevented from blocking or interfering with light from lights **112**, thereby preventing frustration and improving performance and efficiency of spray gun **100**.

Lights **112** are any appropriate lights for illuminating a work area for spray gun **100**. In some embodiments, lights **112** are LED lights. In other embodiments, lights **112** are incandescent lights. In general, lights **112** are located between the side edges of rotatable spray gun light **110** and horn clips **116** (described further below) such that light from lights **112** shine down the sides of spray plume **160**. Lights **112** may be in any appropriate shape or configuration. For example, as illustrated in FIGS. **1**A-**2**B, some embodiments of rotatable spray gun light **110** may include two round LED lights **112**—one on each side of spray plume **160** (i.e., one proximate to one of the horn clips **116**, and another proximate to the other horn clip **116**). Other configurations of lights **112** are discussed below in reference to FIGS. **3**A-**3**B.

Air cap aperture **114** is an appropriately sized and shaped aperture to allow rotatable spray gun light **110** to attach over air cap **130** of spray gun **100**. In some embodiments, air cap aperture **114** is circular in shape. In some embodiments, air cap aperture **114** may include grooves **115** that interlock with grooves **135** of air cap **130**, thereby securing rotatable spray gun light **110** to air cap **130** of spray gun **100**.

Horn clips **116** are any appropriate protrusions or fasteners that permit spray gun **100** to attach to air cap **130**. Typically, air cap **130** of spray gun **100** includes two horns **140** as illustrated in FIG. **1**A. Each horn **140** is located on a respective side of spray plume **160** and include apertures through which spray gun **100** forces air for forming spray plume **160**. Each horn clip **116** may be appropriately shaped to clip to a horn **140**, thereby securing rotatable spray gun light **110** to air cap **130**. For example, horn clips **116** may be protrusions that protrude away from a surface of rotatable spray gun light **110** and are semi-flexible for allowing horn clips **116** to be clipped to horns **140**. Since horns **140** are on respective sides of spray plume **160**, and horn clips **116** attach rotatable spray gun light **110** to air cap **130**, rotatable spray gun light **110** is automatically configured to shine light down the sides of spray plume **160**.

Battery pack **150** stores any appropriate batteries for powering lights **112** of rotatable spray gun light **110**. Battery pack **150** may include any fastening apparatus for fastening battery pack **150** to any part of spray gun **100**. For example, battery pack **150** may be fastened or otherwise secured to spray gun **100** using clips, screws, Velcro, double-sided tape, or any other appropriate fastening apparatus. Battery pack **150** supplies electrical power to rotatable spray gun light **110** via battery cable **155**. Battery cable **155** may be any appropriate length to allow rotatable spray gun light **110** to rotate along with air cap **130** as air cap **130** is rotated.

In operation, rotatable spray gun light **110** is placed over air cap **130** (i.e., air cap **130** slides through air cap aperture **114**) and is secured to air cap **130** using horn clips **116**. In some embodiments, grooves **115** of air cap aperture **114** interlock with grooves **135** of air cap **130**, thereby securing rotatable spray gun light **110** to air cap **130** and preventing rotatable spray gun light **110** from freely rotating around air cap **130**. Rotatable spray gun light **110** is coupled to battery pack **150** using battery cable **155**. In some embodiments, rotatable spray gun light **110** includes an on/off switch (not pictured) that allows rotatable spray gun light **110** to be turned on/off. Once activated, lights **112** of rotatable spray gun light **110** shine light down respective sides of spray plume **160** in order to illuminate an object being sprayed by spray gun **100**. For example, as illustrated in FIG. **2**A, light **112** on the left side of rotatable spray gun light **110** shines light down the left side of spray plume **160** (i.e., the "first" side), and light **112** on the right side of rotatable spray gun light **110** shines light down the right side of spray plume **160** (i.e., the "second" side that is opposite the first side). As air cap **130** is rotated (e.g., FIG. **2**B), rotatable spray gun light **110** rotates along with air cap **130**, thereby preventing spray plume **160** from blocking light from lights **112**.

Certain alternate embodiments of rotatable spray gun light **110** will now be described in reference to FIGS. **3**A-**3**B. FIG. **3**A illustrates a rotatable spray gun light **110** that includes four lights **112** on each side of spray plume **160**. The four lights **112** on the left side of rotatable spray gun light **110** (i.e., between the left side of rotatable spray gun light **110** and the left horn clip **116**) are configured to shine light along a first side of the spray plume (i.e., the left side), and the four lights **112** on the right side of rotatable spray gun light **110** (i.e., between the right side of rotatable spray gun light **110** and the right horn clip **116**) are configured to shine light along a second side of the spray plume (i.e., the right side). Similarly, FIG. **3**B illustrates a rotatable spray gun light **110** that includes seven lights **112** on each side of spray plume **160**. The seven lights **112** on the left side of rotatable spray gun light **110** (i.e., between the left side of rotatable spray gun light **110** and the left horn clip **116**) are configured to shine light along a first side of the spray plume (i.e., the left side), and the seven lights **112** on the right side of rotatable spray gun light **110** (i.e., between the right side of rotatable spray gun light **110** and the right horn clip **116**) are configured to shine light along a second side of the spray plume (i.e., the right side). As illustrated in these figures, lights **112** may be arranged together in any appropriate pattern. For example, lights **112** in FIG. **3**A are arranged in a straight-line pattern, and the lights **112** in FIG. **3**B are arranged in an arrow pattern. Any appropriate pattern may be used (e.g., a curved line, a square, a rectangle, a triangle, a circle, and the like). In some embodiments, the pattern of lights **112** of the left side of rotatable spray gun light **110** mirrors the pattern of the lights **112** on the right side of rotatable spray gun light **110** as illustrated in FIG. **3**B.

FIGS. **4**A and **4**B illustrate front views of another embodiment of rotatable spray gun light **110**, according to certain embodiments. In this embodiment, rotatable spray gun light **110** is formed in a circular shape and includes lights **112** (i.e.,

112A-112G) formed in a circular shape around the edge of rotatable spray gun light **110**. Unlike the previous embodiments of rotatable spray gun light **110**, rotatable spray gun light **110** of FIGS. **4**A-**4**B does not rotate along with air cap **130**. Instead, rotatable spray gun light **110** of these figures is affixed to spray gun **100** in any appropriate manner to prevent rotatable spray gun light **110** from rotating along with air cap **130**. For example, rotatable spray gun light **110** of these figures may not include horn clips **116** but instead use spring tension and friction around air cap **130** or a lock ring of spray gun **100** that enables rotatable spray gun light **110** to be rotated manually (i.e., rotatable spray gun light **110** is not affixed to horns **140** with horn clips **116**), thus allowing adjustment of rotatable spray gun light **110** independent from adjustment of air cap **130**. To avoid having spray plume **160** block lights **112**A-**112**G, rotatable spray gun light **110** of FIGS. **4**A-**4**B includes a sensor (not illustrated) to sense the rotation of air cap **130** or the position of spray plume **160** and then automatically turn off any lights **112**A-**112**G that may be blocked by spray plume **160**. For example, as illustrated in FIG. **4**A, rotatable spray gun light **110** has sensed that spray plume **160** is blocking lights **112**A and **112**E and has accordingly turned off these lights while keeping the remaining lights **112** activated. Similarly, as illustrated in FIG. **4**B, rotatable spray gun light **110** has sensed that spray plume **160** is blocking lights **112**B and **112**F and has accordingly turned off these lights while keeping the remaining lights **112** activated. Any appropriate position sensor may be used in these embodiments (e.g., potentiometric position sensor (resistance-based), inductive position sensor, eddy current-based position sensor, capacitive position sensor, magnetostrictive position sensor, hall effect-based magnetic position sensor, fiber-optic position sensor, optical position sensor, ultrasonic position sensor, and the like).

Herein, "or" is inclusive and not exclusive, unless expressly indicated otherwise or indicated otherwise by context. Therefore, herein, "A or B" means "A, B, or both," unless expressly indicated otherwise or indicated otherwise by context. Moreover, "and" is both joint and several, unless expressly indicated otherwise or indicated otherwise by context. Therefore, herein, "A and B" means "A and B, jointly or severally," unless expressly indicated otherwise or indicated otherwise by context.

The scope of this disclosure encompasses all changes, substitutions, variations, alterations, and modifications to the example embodiments described or illustrated herein that a person having ordinary skill in the art would comprehend. The scope of this disclosure is not limited to the example embodiments described or illustrated herein. Moreover, although this disclosure describes and illustrates respective embodiments herein as including particular components, elements, functions, operations, or steps, any of these embodiments may include any combination or permutation of any of the components, elements, functions, operations, or steps described or illustrated anywhere herein that a person having ordinary skill in the art would comprehend. Furthermore, reference in the appended claims to an apparatus or system or a component of an apparatus or system being adapted to, arranged to, capable of, configured to, enabled to, operable to, or operative to perform a particular function encompasses that apparatus, system, component, whether or not it or that particular function is activated, turned on, or unlocked, as long as that apparatus, system, or component is so adapted, arranged, capable, configured, enabled, operable, or operative.

What is claimed is:

1. A spray gun light comprising:

an aperture configured to allow the spray gun light to attach over an air cap of a spray gun:

a plurality of horn clips, each horn clip configured to couple to a respective horn of a plurality of horns of the air cap of the spray gun; and

a plurality of lights comprising:

a first light configured to shine light along a first side of a spray plume generated by the air cap; and

a second light configured to shine light on along a second side of the spray plume that is opposite the first side;

wherein the spray gun light is configured to rotate along with the air cap as the air cap is rotated, thereby preventing light from the plurality of lights from being blocked by the spray plume.

2. The spray gun light of claim **1**, further comprising an electrical cable configured to supply electrical power to the spray gun light from a battery that is separate from the spray gun light.

3. The spray gun light of claim **1**, further comprising a third light, a fourth light, a fifth light, a sixth light, a seventh light, and an eighth light, wherein:

the first, third, fourth, and fifth lights are configured to shine light along the first side of the spray plume; and

the second, sixth, seventh, and eighth lights are configured to shine light along the second side of the spray plume.

4. The spray gun light of claim **3**, wherein:

the first, third, fourth, and fifth lights are arranged together in a pattern; and

the second, sixth, seventh, and eighth lights are arranged together in the pattern.

5. The spray gun light of claim **4**, wherein the pattern comprises:

a straight line;

a curved line;

an arrow;

a square;

a rectangle;

a triangle; or

a circle.

6. The spray gun light of claim **1**, wherein the aperture comprises a plurality of grooves.

7. The spray gun light of claim **1**, wherein the plurality of lights are LED lights.

8. The spray gun light of claim **1**, wherein the plurality of horn clips are protrusions that protrude away from a surface of the spray gun light.

9. A system comprising:

a battery pack; and

a spray gun light electrically coupled to the battery back, the spray gun light comprising:

an aperture configured to allow the spray gun light to attach over an air cap of a spray gun:

a plurality of horn clips, each horn clip configured to couple to a respective horn of a plurality of horns of the air cap of the spray gun; and

a plurality of lights comprising:

a first light configured to shine light along a first side of a spray plume generated by the air cap; and

a second light configured to shine light on along a second side of the spray plume that is opposite the first side;

wherein the spray gun light is configured to rotate along with the air cap as the air cap is rotated, thereby

preventing light from the plurality of lights from being blocked by the spray plume.

10. The system of claim **9**, the spray gun light further comprising an electrical cable configured to supply electrical power to the spray gun light from the battery pack.

11. The system of claim **9**, the spray gun light further comprising a third light, a fourth light, a fifth light, a sixth light, a seventh light, and an eighth light, wherein:

the first, third, fourth, and fifth lights are configured to shine light along the first side of the spray plume; and

the second, sixth, seventh, and eighth lights are configured to shine light along the second side of the spray plume.

12. The system of claim **11**, wherein:

the first, third, fourth, and fifth lights are arranged together in a pattern; and

the second, sixth, seventh, and eighth lights are arranged together in the pattern.

13. The system of claim **12**, wherein the pattern comprises:

a straight line;

a curved line;

an arrow;

a square;

a rectangle;

a triangle; or

a circle.

14. The system of claim **9**, wherein the aperture comprises a plurality of grooves.

15. The system of claim **9**, wherein the plurality of lights are LED lights.

16. The system of claim **9**, wherein the plurality of horn clips are protrusions that protrude away from a surface of the spray gun light.

17. A spray gun light comprising:

a first plurality of lights configured to shine light along a first side of a spray plume generated by an air cap of a spray gun;

a second plurality of lights configured to shine light along a second side of the spray plume that is opposite the first side; and

an electrical cable configured to supply electrical power to the spray gun light from a battery that is separate from the spray gun light;

wherein the spray gun light is configured to rotate along with the air cap as the air cap is rotated, thereby preventing light from the first and second plurality of lights from being blocked by the spray plume.

18. The spray gun light of claim **17**, wherein:

the first plurality of lights are arranged together in a pattern; and

the second plurality of lights are arranged together in the pattern.

19. The spray gun light of claim **18**, wherein the pattern comprises:

a straight line;

a curved line;

an arrow;

a square;

a rectangle;

a triangle; or

a circle.

* * * * *